INSTRUCTION MANUAL

RADA-PULSER - 5070-A

KAY ELECTRIC CO.
PINE BROOK, N. J.

OPERATING INSTRUCTIONS
ISSUE A

OCTOBER 1964

RADA-PULSER SR.

Catalog #5070-A

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KAY ELECTRIC COMPANY
PINE BROOK, N.J.
CApital 6-4000

RADA-PULSER SR. 5070-A

OPERATOR'S MANUAL

SECTION I
GENERAL INFORMATION

1.1 INTRODUCTION.

The Rada-Pulser Sr. 5070-A is a fully transistorized pulsed-carrier generator; it provides sharp rise and decay times and flat tops. You can obtain pulsed r-f, video pulses, or c-w output from this instrument. The pulse widths are continuously variable from 100 ns to 100 us, and the repetition rate can be varied from 50 to 5000 pps.

The pulsed r-f output is generated by an oscillator which is controlled by a pulse generator with a diode switch. The r-f output is held at the same peak levels during either c-w or pulsed r-f operation. The carrier pulses are flat (including overshoot) within ± 5% and the rise and decay times are less than 10 ns. The output level can be varied to a maximum of 0.5 volt rms into 50 ohms. The carrier-off level is greater than 70 db (to 85 db) below the carrier level, within the normal frequency range of the instrument. The diode switch, in addition to being driven by the internal pulse generators, can be driven by any external source. An input pulse of approximately -2 volts will trigger the 5070-B, in either pulsed-carrier or video-pulse mode. The video-pulse generator provides the same range of pulse width as the pulsed carrier, and with rise and decay times of less than 20 ns. In this function, you can obtain a maximum output of ± 3 volts into a 50-ohm lead. A sync pulse is available which precedes the output by 40 ns.

During c-w operation, the 5070-A will generate a signal, continuously variable, from 10 to 120 mc in five overlapping bands. A 101 db step attenuator is included in the instrument enabling comparative output measurements to be made on an oscilloscope. The unit also has a variable gain control, having a range of 6 db, providing a continuous range of attenuation. The output amplitude during c-w is monitored by a front-panel meter.

1.2 SPECIFICATIONS.

Frequency Range: 10 to 120 mc with a direct reading dial in 5 overlapping ranges. Dial accuracy is ± 1%.

Output Amplitude: CW - 0.5V rms into 50 ohms;
Pulsed R-F Carrier Level - 0.5V into 50 ohms;
Video Pulse - ± 3V peak into 50 ohms;

Carrier-Off Level: 85 db to 30 mc, 80 db to 70 mc, 70 db to 120 mc.

Pulsed Carrier Rise & Decay Times: Less than 10 ns.

Video Pulse Rise & Decay Times: Less than 20 ns.

Pulse Repetition Rate: 50 pps to 5000 pps.

Pulse Width: 100 ns to 100 us.

Attenuator: 101 db in 1 db steps plus approximately 6 db variable.

Sync Output: 2.5V peak into 50 ohms with 20 ns rise time.
Sync pulse precedes the output pulse by approx. 40 ns.

External Trigger Input: Approximately a -2V pulse.

Power Supply: 117V ± 10%, 50-60 cps. Power consumption approx. 15W.
All supply voltages electronically regulated.

SECTION 11
FRONT PANEL CONTROLS AND TERMINALS

2.1 FRONT PANEL CONTROLS.

CONTROL	POSITION	FUNCTION
Selector Switch	OFF	The unit is completely shut off.
	CW	A c-w signal is available at the PULSE OR RF OUT jack.
	PULSED RF	A pulsed carrier is available at the PULSE OR RF OUT jack.
	+ VIDEO PULSE	A + 3 volt video pulse is available at the PULSE OR RF OUT jack.
	- VIDEO PULSE	A - 3 volt video pulse is available at the PULSE OR RF OUT jack.
Frequency Selector	COARSE	Selects either frequency range or external oscillator input.
	FINE	Enables continuous tuning of the desired band.
RF OR PULSE LEVEL	Variable	Provides variable attenuation of CW, PULSED RF, or VIDEO PULSE output. Range is approximately 6 db.
PULSE RATE	EXT MOD	A positive pulse of about 2 volts will turn the pulsed rf on; zero volts will shut it off. The input impedance is nominally 50 ohms, and the circuitry is d-c coupled permitting the use of extremely long pulses. The external modulation controls both the repetition rate and width of the pulsed carrier.
	EXT TRIGGER	Permits external control of the pulse repetition rate only. It requires approximately a -2 volt pulse for triggering.
	50 - 500 500 - 5 kc	These positions select the range of pulse repetition rates. The RATE ADJ control permits full variation.
PULSE WIDTH	.1 - 1.0 us 1.0 - 10 us 10 - 100 us	These positions select the range of pulse widths. The WIDTH ADJ control permits full variation.
Attenuator	Switchable	Provides 101 db of attenuation in 1 db steps.

2.2 FRONT PANEL TERMINALS.

TERMINAL	FUNCTION
EXT OSC	Permits the use of an external oscillator, when the Frequency Selector is in the EXT OSC position. This jack presents an impedance of 50 ohms; signals from 5 to 150 mc at 1 volt rms may be used. When not in use, the external oscillator should be removed.
EXT MOD	Permits the use of external modulation, when the PULSE RATE switch is in the EXT MOD position.
EXT TRIGGER	Permits the use of external triggering, when the PULSE RATE switch is in the EXT TRIGGER position.
SYNC OUT (POS)	Provides a high-impedance sync pulse output. The pulse is + 2.5 volts peak, and has a rise time of approximately 20 ns.
PULSE OR RF OUT (50 OHM)	Supplies c-w, pulsed rf, or video pulses into a 50-ohm load.

SECTION III
CIRCUIT DESCRIPTION

PULSE GENERATOR

The first stage of the pulse generator is an astable multivibrator whose repetition rate is variable from about 40 cps to 6000 cps in two ranges, each range using different timing capacitors, but the same potentiometers for controlling repetition rate. This is followed by a pulse amplifier to sharpen the rise and fall times of the Repetition Rate Multivibrator and to act as a buffer. The pulse is then differentiated through a diode-capacitor network and fed to the Pulse Width Multivibrator. The Pulse Width Multivibrator is a monostable multivibrator. The width of the quasi-stable state is variable from 100 ns to 100 us in the ranges of 100 ns to 1 us, 1 us to 10 us, and 10 us to 100 us, each range using a different timing capacitor but the same potentiometer for controlling pulse width. This multivibrator may be triggered by an external source.

The Pulse Width Multivibrator is followed by a pulse amplifier to sharpen the rise and fall times of the pulse. This is followed by another pulse amplifier supplying more power while sharpening the rise and fall times and controlling the amplitude of the pulse. This amplifier may be controlled by an external modulation. The Sync Out amplifier is a pulse amplifier and preceeds the Pulse Width Multivibrator. It supplies a positive 2.5 volt spike of about 10 ns rise time and preceeds the pulse or r-f output by about 40 ns.

CARRIER OSCILLATOR AND ISOLATION AMPLIFIERS

The carrier oscillator is a transistorized push-pull oscillator producing a large and stable waveform with low distortion. The oscillator is variable from 10 mc to 120 mc in five overlapping ranges. This is followed by an isolation amplifier producing 10 db of attenuation, and isolating the oscillator from the rest of the circuitry, so that the frequency will remain stable and the output level constant. This is followed by an emitter follower to feed into a low impedance at the diode switch.

AGC

The AGC Detector is a diode doubler and monitors the RF level between the two isolation amplifiers. The RF voltage is detected at this point, amplified through high gain DC amplifiers and controls the oscillator level by varying the base voltages in the oscillator. This also aids in stabilizing frequency and reducing distortion.

DIODE SWITCH AND DRIVER

The diode switch is a balanced diode modulator consisting of two sets of diode "T" networks, so that the pulsed RF will be of equal amplitude above and below ground level. The switch receives the RF from the second isolation amplifier and is gated on and off by the diode switch driver which receives a signal from the pulse generator.

OUTPUT AMPLIFIERS

The output of the diode switch is fed into a potentiometer which continuously adjusts the RF level. The signal now feeds into the first RF amplifier which supplies about 10 db voltage gain. The signal now goes into an emitter follower to provide the necessary power gain. In the video pulse operation, the signal is switched to a video pulse amplifier to provide the necessary power out. The CW, Pulsed RF or Video Pulse then passes through a 101 db attenuator to the PULSE OR RF OUT jack. The output of the emitter follower is detected and displayed on the front panel meter.

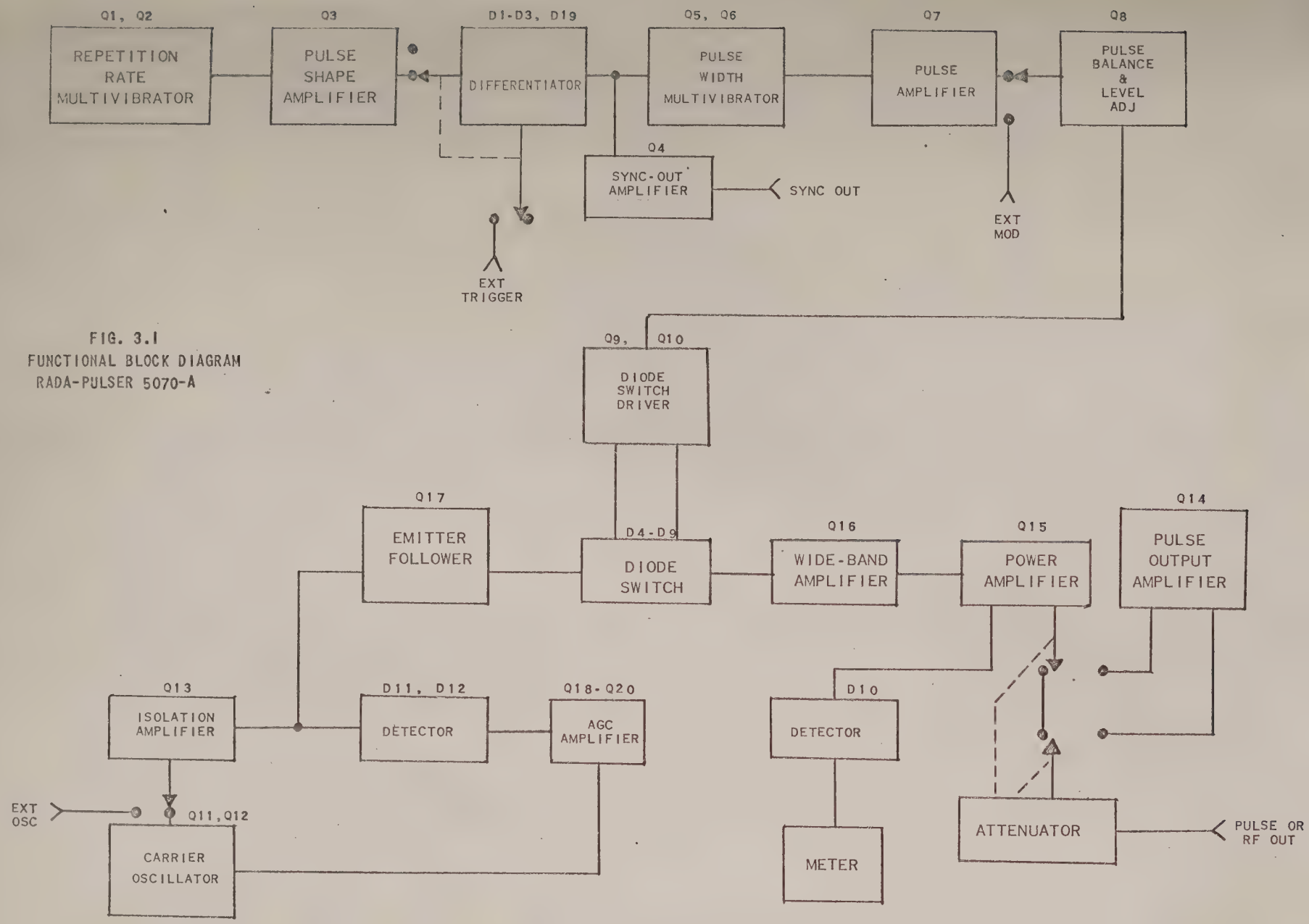


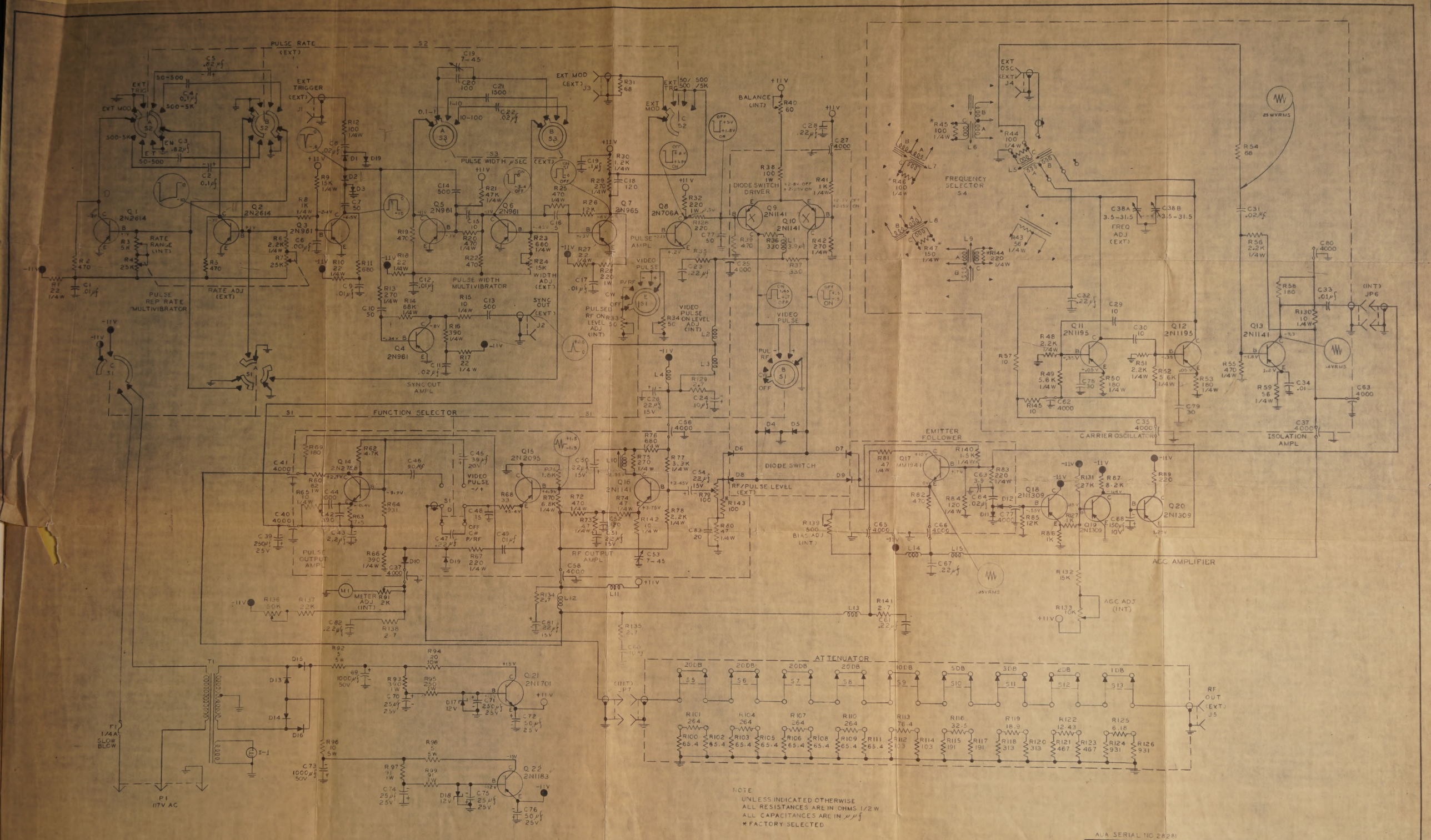
FIG. 3.1
FUNCTIONAL BLOCK DIAGRAM
RADA-PULSER 5070-A

RADA-PULSER SR' 5070-A

ADDENDUM #M-8523H

This addendum covers a correction to the specifications only, as listed in section 1, Paragraph 1-2. Specification of SYNC OUTPUT should read as follows:

Sync Output: 2.5 volts peak into high impedance with approx. 20NS Rise Time.



NOTE
UNLESS INDICATED OTHERWISE
ALL RESISTANCES ARE IN OHMS 1/2W
ALL CAPACITANCES ARE IN μμf
* FACTORY SELECTED

AUA SERIAL NO 28281

SCHEMATIC	RADA-PULSER MODEL 5070	
MAT.	FINISH:	SCALE:
DIMENSION TOLERANCES UNLESS OTHERWISE SPECIFIED. DECIMAL DIMENSIONS ± .005 FRACTIONAL DIMENSIONS ± 1/64	KAY ELECTRIC CO. PINE BROOK, N. J.	
CHANGE	DATE	APP.
23 Wave forms & voltages added	3-6-64	
22 ECN No 827	1-7-64	
21 ECN No 827	12-26-63	
20 ECN No 824	10-24-63	
19 ECN # 877	11-14-63	
18 ECN # 887	11-27-63	
17 ECN No 710	9-25-63	
DWN. BY AWPIERCE	DATE 4/11/64	
APP. BY	DATE	
DWG. NO. D 8523 I		

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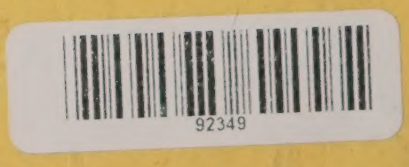
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